

EPA Office of Compliance Sector Notebook Project

Air Transportation Industry

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Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
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This report is one in a series of volumes published by the U.S. Environmental Protection Agency (EPA) to provide information of general interest regarding environmental issues associated with specific industrial sectors. The documents were developed under contract by Abt Associates (Cambridge, MA), Science Applications International Corporation (McLean, VA), and Booz-Allen & Hamilton, Inc. (McLean, VA). This publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office. A listing of available Sector Notebooks and document numbers is included at the end of this document.

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Electronic versions of all Sector Notebooks are available via Internet on the Enviro\$en\$e World Wide Web. Downloading procedures are described in Appendix A of this document.

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LIST OF ACRONYMS

AFS	AIRS Facility Subsystem (CAA database)
AIRS	Aerometric Information Retrieval System (CAA database)
BIFs	Boilers and Industrial Furnaces (RCRA)
BOD	Biochemical Oxygen Demand
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CATC	Clean Air Technology Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
CFCs	Chlorofluorocarbons
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CSI	Common Sense Initiative
CWA	Clean Water Act
D&B	Dun and Bradstreet Marketing Index
DOT	U.S. Department of Transportation
ELP	Environmental Leadership Program
EMS	Environmental Management System
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FAA	Federal Aviation Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS	Facility Indexing System
FWPCA	Federal Water Pollution Control Act
HAP	Hazardous Air Pollutant (CAA)
HSDB	Hazardous Substances Data Bank
HSWA	Hazardous and Solid Waste Amendments
ICAO	International Civil Aviation Organization
IDEA	Integrated Data for Enforcement Analysis
LDR	Land Disposal Restriction (RCRA)
LEPC	Local Emergency Planning Committee
MACT	Maximum Achievable Control Technology (CAA)
MCLG	Maximum Contaminant Level Goal
MCL	Maximum Contaminant Level
MEK	Methyl Ethyl Ketone
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards (CAA)
NAFTA	North American Free Trade Agreement
NAICS	North American Industrial Classification System
NCDB	National Compliance Database (for TSCA, FIFRA, EPCRA)
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEIC	National Enforcement Investigation Center
NESHAP	National Emission Standards for Hazardous Air Pollutants

NO ₂	Nitrogen Dioxide
NOI	Notice of Intent
NOV	Notice of Violation
NO _x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System (CWA)
NPL	National Priorities List
NRC	National Response Center
NSPS	New Source Performance Standards (CAA)
OAR	Office of Air and Radiation
OECA	Office of Enforcement and Compliance Assurance
OPA	Oil Pollution Act
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OSHA	Occupational Safety and Health Administration
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
OW	Office of Water
P2	Pollution Prevention
PCS	Permit Compliance System (CWA Database)
PM ₁₀	Particulate matter of 10 microns or less
PMN	Premanufacture Notice
POTW	Publicly Owned Treatments Works
PT	Total Particulates
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RCRIS	RCRA Information System
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEP	Supplemental Environmental Project
SERC	State Emergency Response Commission
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SO _x	Sulfur Oxide
SPCC	Spill Prevention Control and Countermeasures
TOC	Total Organic Carbon
TRI	Toxic Release Inventory
TRIS	Toxic Release Inventory System
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
TSS	Total Suspended Solids
UIC	Underground Injection Control (SDWA)
UST	Underground Storage Tank (RCRA)
VOC	Volatile Organic Compound

AIR TRANSPORTATION INDUSTRY (SIC 45)

I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT

I.A. Summary of the Sector Notebook Project

Integrated environmental policies based upon comprehensive analysis of air, water, and land pollution are a logical supplement to traditional single-media approaches to environmental protection. Environmental regulatory agencies are beginning to embrace comprehensive, multi-statute solutions to facility permitting, enforcement and compliance assurance, education/outreach, research, and regulatory development issues. The central concepts driving the new policy direction are that pollutant releases to each environmental medium (air, water, and land) affect each other, and that environmental strategies must actively identify and address these inter-relationships by designing policies for the “whole” facility. One way to achieve a whole facility focus is to design environmental policies for similar industrial facilities. By doing so, environmental concerns that are common to the manufacturing of similar products can be addressed in a comprehensive manner. Recognition of the need to develop the industrial “sector-based” approach within the EPA Office of Compliance led to the creation of this document.

The Sector Notebook Project was originally initiated by the Office of Compliance within the Office of Enforcement and Compliance Assurance (OECA) to provide its staff and managers with summary information on major industrial sectors. As other EPA offices, states, the regulated community, environmental groups, and the public became interested in this project, the scope of the original project was expanded to its current form. The ability to design comprehensive, common sense environmental protection measures for specific industries is dependent on knowledge of several inter-related topics. For the purposes of this project, the key elements chosen for inclusion are: general industry information (economic and geographic); a description of industrial processes; pollution outputs; pollution prevention opportunities; Federal statutory and regulatory framework; compliance history; and a description of partnerships that have been formed between regulatory agencies, the regulated community and the public.

For any given industry, each topic listed above could alone be the subject of a lengthy volume. However, in order to produce a manageable document, this project focuses on providing summary information for each topic. This format provides the reader with a synopsis of each issue, and references where more in-depth information is available. Text within each profile was researched from a variety of sources, and was usually condensed from more detailed sources pertaining to specific topics. This approach allows for a

wide coverage of activities that can be further explored based upon the citations and references listed at the end of this profile. As a check on the information included, each notebook went through an external review process. The Office of Compliance appreciates the efforts of all those that participated in this process who enabled us to develop more complete, accurate and up-to-date summaries.

I.B. Additional Information

Providing Comments

OECA's Office of Compliance plans to periodically review and update the notebooks and will make these updates available both in hard copy and electronically. If you have any comments on the existing notebook, or if you would like to provide additional information, please send a hard copy and computer disk to the EPA Office of Compliance, Sector Notebook Project, 401 M St., SW (2223-A), Washington, DC 20460.

Adapting Notebooks to Particular Needs

The scope of the industry sector described in this notebook approximates the national occurrence of facility types within the sector. In many instances, industries within specific geographic regions or states may have unique characteristics that are not fully captured in these profiles. The Office of Compliance encourages state and local environmental agencies and other groups to supplement or re-package the information included in this notebook to include more specific industrial and regulatory information that may be available. Additionally, interested states may want to supplement the "Summary of Applicable Federal Statutes and Regulations" section with state and local requirements. Compliance or technical assistance providers may also want to develop the "Pollution Prevention" section in more detail. Please contact the appropriate specialist listed on the opening page of this notebook if your office is interested in assisting us in the further development of the information or policies addressed within this volume. If you are interested in assisting in the development of new notebooks for sectors not covered in the original eighteen, please contact the Office of Compliance at (202) 564-2395.

II. INTRODUCTION TO THE AIR TRANSPORTATION INDUSTRY

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the air transportation industry. Facilities described within this document are described in terms of their Standard Industrial Classification (SIC) codes.

II.A. Introduction, Background, and Scope of the Notebook

This notebook pertains to the transportation industry as classified within SIC code 45 (Transportation by Air). (Please note that this section provides both the SIC code and the new North American Industrial Classification System (NAICS) code, which went into effect January 1, 1997. While the NAICS code is identified in this section, the remainder of the document will refer to the SIC codes for specific air transportation activities.)

The transportation industry includes other modes of transport, such as trucking, railroad, pipeline, and water, which make up an important portion of overall transportation activity in the United States. These modes are addressed in two sector notebooks. Trucking, railroad, and pipeline transportation are addressed in *Ground Transportation Industry* [EPA/310-R-97-002], and water transportation is addressed in *Water Transportation Industry* [EPA/310-R-97-003].

The air transportation industry (SIC 45) includes establishments engaged in furnishing domestic and foreign transportation by air and also operating airports and flying fields and furnishing terminal services. Specifically, this notebook includes the following groups:

SIC 4512 - Air Transportation, Scheduled (NAICS 481111 and 481112). This sector includes establishments primarily engaged in furnishing air transportation over regular routes and on regular schedules. This industry includes Alaskan carriers operating over regular or irregular routes.

SIC 4513 - Air Courier Services (NAICS 49211). This sector includes establishments primarily engaged in furnishing air delivery of individually addressed letters, parcels, and packages (generally under 100 pounds), except by the U.S. Postal Service. Separate establishments of air courier companies which provide pick-up and delivery only, "drop-off points," or distribution centers are all classified in this industry.

SIC 4522 - Air Transportation, Nonscheduled (NAICS 481211, 481212, 48799, 62191). This sector includes establishments engaged in furnishing nonscheduled air transportation. Also included in this industry are establishments primarily engaged in furnishing airplane sightseeing services,

air taxi services, and helicopter passenger transportation services to, from, or between local airports, whether scheduled or not scheduled.

SIC 4581 - Airports, Flying Fields, and Airport Terminal Services (NAICS 488111, 488119, 56172, 48819). This sector includes establishments primarily engaged in operating and maintaining airports and flying fields; in servicing, repairing (except on a factory basis), maintaining, and storing aircraft; and in furnishing coordinated handling services for airfreight or passengers at airports. This industry also include private establishments primarily engaged in air traffic control operations (except government).

II.B. Characterization of the Air Transportation Industry

II.B.1. Industry Characterization

The transportation industry affects nearly every American. Either through the necessity of traveling from one place to another, shipping goods and services around the country, or working in a transportation-related job, transportation's share of the national economy is significant. According to the Eno Transportation Foundation, for all transportation-related industries, total transportation expenditures in the U.S. accounted for 16.1 percent of the gross national product in 1993.

The airline industry in particular provides transportation of passengers, cargo, mail and perishable goods. American citizens have come to rely on domestic and international air transportation more and more every year. Airline travel in the United States has been getting safer over the years and is the safest in the world. The National Safety Council's latest fatality totals for 1995 show 175 deaths caused by United States airline accidents. By contrast, five times as many people died in boating accidents and accidents involving bicycles and tricycles.

II.B.1.1. Types of Aircrafts and Airports

Generally, the air transportation sector can be broken down into two categories: (1) facilities providing scheduled, non-scheduled, and air courier services using aircraft, and (2) airports and airport operations. It is these two major topics (i.e., aircraft facilities and airports) and the activities and operations that occur within each of these areas that are the primary focus of this notebook.

Categories of Aircraft

There are five types of aircraft that compose the aviation industry: commercial, air taxi operations, commuter, general, and military.

Commercial aircraft encompass air carriers and air taxi flights. Air carriers are airlines holding a certificate issued of public convenience and necessity under Section 401 of the Federal Aviation Act of 1958 authorizing them to perform passenger and cargo services. Air carriers operate aircraft designed to have a maximum seating capacity of more than 60 seats, to have a maximum payload capacity of more than 18,000 pounds, or to conduct international operations. The four different types of air carriers (and their annual operating revenues) are:

- Majors (greater than \$1 billion)
- Nationals (\$100 million to \$1 billion)
- Large regionals (\$20 million to \$100 million)
- Medium regionals (Up to \$20 million).

Air taxi operations are those in which departure time, departure location, and arrival location are specifically negotiated with the customer or by the customer's representative and are conducted with airplanes or rotorcraft having a seating configuration of 30 or fewer seats.

Commuter aircraft are noncertified small regionals who perform scheduled service to smaller cities and serve as feeders to the major hub airports. They generally carry 60 or fewer passengers.

General aviation is all aviation that is not commercial or military. General aviation is the segment of civil aviation that encompasses all facets of aviation except air carriers and commuters. General aviation includes corporate-executive transportation, instruction, rental, aerial application, aerial observation, business, pleasure, and other special uses.

Military refers to the operators of all military (e.g., Air Force, Army, Navy, U.S. Coast Guard, Air National Guard, and military reserve organizations) aircraft using civil airports.

Classification of Airports

The system of airports in the U.S. is the largest and most complex in the world. As of 1990, there were 17,451 civil landing areas (e.g., airports, heliports, seaplane bases, etc.) in the U.S. The activity and services at individual airports vary greatly. Regardless of size, many activities occur at airports including fueling, aircraft maintenance, aircraft washing, and deicing. In addition, two primary activities at most airports are enplaning passengers and enplaning air cargo. Enplaning passengers is defined as the total number of passengers departing on aircraft at the airport. Enplaning air cargo includes the total tonnage of priority, nonpriority, and foreign mail, express, and freight (property other than baggage accompanying passengers) departing on aircraft at an airport.

Airport Ownership. Public airports in the U.S. are owned and operated under a variety of organizational and jurisdictional arrangements. Commercial airports might be owned and operated by a city, county, or State; or by more than one jurisdiction. Additionally, some airports may be operated by a separate public body, such as an airport authority. Regardless of ownership, legal responsibility for day-to-day operations can be vested in any of five kinds of governmental or public entities:

- Municipal or county government. Municipally operated airports are city owned and run as a department of the city.
- A multipurpose port authority. Port authorities are legally chartered institutions with the status of public corporations.
- An airport authority.
- State government.

Classification of airports with scheduled services. Airports with scheduled passenger service have several classifications:

- Commercial service airports are those airports receiving passenger service and having 2,500 or more annual enplanements.
- Primary airports are commercial service airports having 10,000 or more enplanements.
- Hub airports are airports that serve as a transfer point for passengers changing flights. Commercial service airports are classified as large, medium, or small hub airports or non-hub airports, depending on the percentage of total national enplanements for which they account.
- General aviation airports encompass the bulk of civil aircraft operations. The general aviation system includes 98% of all registered civil aircraft and 95% of all airports.
- Reliever airports are a special category of general aviation airports. Located in the vicinity of major air carrier airports and classified by the Federal Aviation Administration as a reliever, these airports are designed to provide relief to congested major airports.

Terminal Facilities. The terminal and associated landside facilities such as the parking areas and access roads provide the transition zone for passengers between surface and air transportation. Landside facilities are long-term installations and are largely independent of activities that occur airside. Concession and food service operations provide food and materials goods for passengers.

II.B.1.2. Requirements Pertaining to the Aviation Industry

The Federal Aviation Administration's (FAA's) major responsibilities include overseeing aircraft safety and the competency of pilots and mechanics. The FAA does this by providing mandatory safety rules, conducting safety inspections, and setting high standards for civil aviation.

Noise Abatement. In addition to safety, the FAA also addresses issues such as noise abatement. As a result of complaints against aircraft noise, which increased dramatically with the introduction of jet aircraft, the *Federal Aviation Act of 1958* was amended to include noise abatement regulations designed to establish noise levels which aircraft manufacturers cannot exceed in the development of new aircraft. In 1979, the *Aviation Safety and Noise Abatement Act* authorized the FAA to help airport operators develop noise mitigation abatement programs.

The *Airport Noise and Capacity Act of 1990* authorized DOT/FAA to reduce aircraft engine noise by requiring an aircraft fleet replacement program. The estimated effect of the phase out of larger, noisier aircraft is estimated to reduce the number of people exposed to significant noise levels of aircraft noise in the U.S. from 2.7 million in 1990 to 400,000 by the year 2000, when the phaseout is complete. The law also limited airport operators' abilities to place noise or access restrictions on airports in the interest of avoiding an overly burdensome patchwork of individual operating limitations across the United States.

Standards for Aircraft Design. The FAA works closely with aircraft manufacturers while examining designs for new planes. The FAA sets very high standards for aircraft designs. Once the design has been thoroughly examined and the first model has completed a grueling series of flight tests and evaluations, the model is certificated for production by the FAA (<http://www.faa.gov/publicinfo.htm>).

Monitoring and Maintenance of Existing Aircraft. Once the aircraft has been certified and put into service, the FAA continues to monitor its performance. When necessary, the FAA will issue repair notices known as "Airworthiness Directives" to the manufacturers and airlines when problems are spotted. The FAA issues several hundred notices a year. In addition, manufacturers often issue Service Bulletins to advise aircraft carriers of safety improvements or procedures that will enhance safety.

FAA airworthiness requirements specify materials to be used during maintenance or other technical specifications and standards (e.g., cleaning, deicing) that limit the airlines' ability to change materials, procedures, or processes.

Flight Personnel. The FAA sets standards for training, health, experience, number of hours worked, and qualifications for pilots and other flight personnel. Because pilots play such a vital role in maintaining aircraft operations safety, they are especially heavily regulated by the FAA. Pilots must have their health examined every six months. They must pass special examinations and flight tests, and those serving as captains are required to possess hundreds of hours of additional flying time. FAA tests their flying skills on a regular basis. DOT and FAA safety policies and rules expressly place the ultimate legal authority for aircraft operation fully and solely on the pilot in command of the aircraft (14 CFR §91.3(a)).

Air Traffic Control Operations. FAA is responsible for developing, maintaining, and operating the nation's Air Traffic Control System, which is in charge of ensuring the safe separation of aircraft during flight and sequencing aircraft for taxiing, takeoff, and landing.

Maintenance Personnel. Airline mechanics and technicians must be certified by the FAA. In addition, repair stations must obtain an FAA operating certificate and are subject to regular inspection by the agency.

For more information about FAA airworthiness requirements, see the FAA website at <http://www.faa.gov/publicinfo.htm>.

II.B.1.3. International Aviation

After 1945, commercial air transportation began to transcend domestic markets into the international arena, therefore, the standardization of operational practices for international services, such as navigational aids and weather reporting systems, became essential. There were also many political and technical problems that needed to be solved. For example, there was the issue of commercial rights: what arrangements were needed for the airlines of one country to fly into and through territories of another? For more information relating to International Civil Aviation Organization (ICAO) and other international milestones, refer to *Memorandum on ICAO*, January 1994.

II.B.2. Industry Size and Geographic Distribution

Industry Size

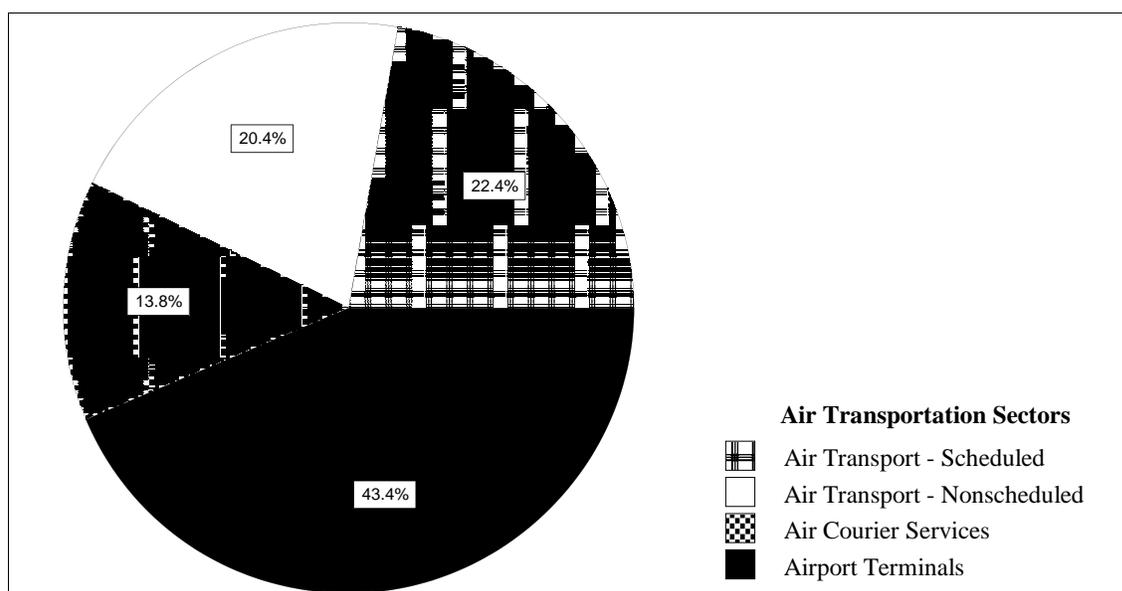
According to Dun & Bradstreet, there were an estimated 16,282 air transportation establishments in the U.S. as of April 1997. Exhibit 1 provides information on each of the SIC codes in the air transportation industry, including total number of establishments and employees, and total annual sales.

Exhibit 1. Market Size Analysis of Air Transportation Industry			
SIC Code	No. of Establishments	No. of Employees	Annual Sales (millions)
4512	3,638	320,837	147,858.6
4513	2,252	75,493	15,172.9
4522	3,321	39,253	7,019.0
4581	7,071	220,986	15,616.8
Total	16,282	656,569	185,667.3

Source: Dun & Bradstreet Marketplace (www.dnb.imarketinc.com), December 1997

Exhibit 2 displays the percentages of establishments per air transportation sector discussed above.

Exhibit 2: Distribution of Establishments by Sector



Source: Dun & Bradstreet Marketplace, December 1997 (www.dnb.imarketinc.com)

Exhibit 3 lists the busiest airports in terms of the total passengers and cargo. Keep in mind that 99% of the nation's airports are much smaller than these airports, but conduct the same activities to a lesser extent or volume.

Exhibit 3. Activity at the 10 Busiest Airports (1996)			
Leading Airports in Passengers Arriving & Departing (Millions)		Leading Airport in Cargo Tons Enplaned & Deplaned (Thousands)	
Chicago O'Hare	69.2	Memphis	1934
Atlanta	63.3	Los Angeles	1719
Dallas/Ft. Worth	58	Miami	1710
Los Angeles	57.9	New York Kennedy	1636
San Francisco	39.3	Louisville	1369
Miami	33.5	Anchorage	1269
Denver	32.3	Chicago O'Hare	1259
New York Kennedy	31.2	Newark	958
Detroit	30.6	Atlanta	800
Las Vegas	30.5	Dallas/Ft. Worth	774

Source: 1997 Air Transport Association Annual Report

The activity and services of the aviation industry vary greatly. Exhibit 4 presents the top 10 airlines of scheduled service in the U.S.

Exhibit 4. Top 10 Airlines of Scheduled Service (1996)	
Airline	Passengers (millions)
Delta	97.2
United	81.9
American	79.3
US Airways	56.6
Southwest	55.3
Northwest	52.7
Continental	35.7
Trans World	23.3
America West	18.1
Alaska	11.8

Source: 1997 Air Transport Association Annual Report

Company size varies greatly among air transportation facilities. Exhibit 5 presents an analysis of the number of businesses compared to the number of employees per air transportation sector. The distribution of establishments with a specific employee size varies from one SIC code to another.

Exhibit 5. Number of Businesses by Company Size				
No. of Employees	Number of Businesses			
	Scheduled	Nonscheduled	Air courier	Airports
1	147	381	104	854
2 to 4	436	1533	985	1699
5 to 9	415	572	265	1092
10 to 24	484	450	244	837
25 to 49	286	172	148	386
50 to 99	219	64	151	217
100 to 249	252	41	208	189
250 to 499	75	6	7	79
500 to 999	31	2	5	27
1,000 to 9,999	43	3	2	25
>=10,000	6		1	3
Unknown	1244	97	131	1674
Totals	3638	3321	2252	7071

Source: Dun & Bradstreet Marketplace, December 1997 (www.dnb.imarketinc.com)

Geographic Distribution

The air transportation industry is widely dispersed. Of the total of 16,282 U.S. establishments in the air transportation industry, most are located in California, Texas, Florida, Illinois, and New York. Exhibits 6 and 7 identify the five states with the most establishments and employees by air transportation SIC code.

Exhibit 6. Top Five States with Air Transportation Establishments					
SIC Code	States (Number of Establishments)				
Air transportation, scheduled (SIC 4512)	CA (426)	FL (369)	NY (321)	TX (258)	IL (200)
Air transportation, nonscheduled (SIC 4522)	CA (348)	FL (314)	TX (236)	NY (151)	AK (146)
Air courier services (SIC 4513)	CA (328)	NY (308)	FL (208)	TX (194)	IL (91)
Airports, flying fields, & services (SIC 4581)	CA (747)	TX (641)	FL (551)	NY (304)	IL (264)

Source: Dun & Bradstreet Marketplace, December 1997 (www.dnb.imarketinc.com)

Exhibit 7. Top Five States with Air Transportation Industry Employees					
SIC Code	States (Number of Employees)				
Air transportation, scheduled (SIC 4512)	TX (37,691)	CA (31,396)	MN (31,363)	GA (30,484)	NY (18,111)
Air transportation, nonscheduled (SIC 4522)	FL (3,662)	CA (3,580)	MN (2,546)	IN (2,437)	MI (2,428)
Air courier services (SIC 4513)	TN (20,374)	CA (6,299)	OH (6,299)	NY (5,762)	TX (5,143)
Airports, flying fields, & services (SIC 4581)	FL (36,414)	CA (35,225)	TX (15,755)	NY (15,702)	IL (15,762)

Source: Dun & Bradstreet Marketplace, December 1997 (www.dnb.imarketinc.com)

Exhibit 8 presents the top five states for each SIC code with the highest total sales in millions of dollars. California, Florida, New York, and Texas are consistently among the top five for these sectors.

Exhibit 8. Top Five States with Highest Air Transportation Sales					
SIC Code	States (Total sales in millions)				
Air transportation, scheduled (SIC 4512)	TX (41,080.5)	IL (36,807)	MN (27,512)	VA (13,859)	GA (13,109.7)
Air transportation, nonscheduled (SIC 4522)	IN (1,019.9)	OR (776.7)	FL (516.2)	CA (534.70)	NY (506.1)
Air courier services (SIC 4513)	TX (8,867.3)	CA (2,793.6)	WA (1,976)	OH (602.1)	NY (353.9)
Airports, flying fields, & services (SIC 4581)	FL (3,426.5)	NY (2,544.7)	TX (1,762.8)	VA (1,639)	CA (596.4)

Source: Dun & Bradstreet Marketplace, December 1997 (www.dnb.imarketinc.com)

II.B.3. Economic Trends

Aviation Trends and Forecasts

The aviation industry has been growing steadily and is expected to continue. U.S. commercial air carrier passenger enplanements, which had averaged less than 1.0 percent growth between 1990 and 1993, grew at an annual rate of 6.2 percent over the last 3 years. In 1996, the large U.S. air carriers increased their system capacity by only 2.9 percent, while passenger demand increased by 6.1 percent. Exhibit 9 presents the trends for U.S. scheduled airlines in passengers enplaned and domestic cargo from 1960 to 1996.

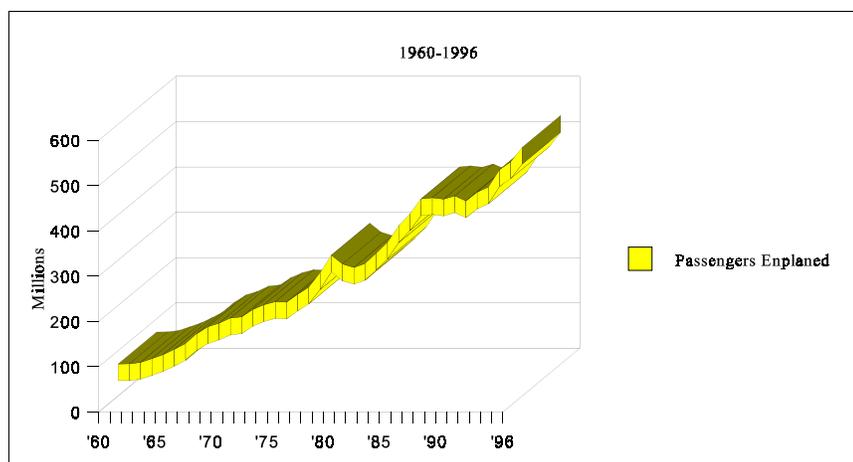
Exhibit 9: Summary of Domestic Passenger Traffic

The FAA predicts that domestic departures for commercial carriers will increase from 7.1 in 1997 to 9.2 million by 2008. Exhibit 10 presents additional FAA forecasts for the aviation industry.

Exhibit 10. Forecast for U.S. Commercial Carriers and Regionals/Commuters FY1998 - 2009				
Year	Passengers (Millions)¹	Revenue Passenger Miles (Billions)¹	Jet Aircraft²	Aircraft Operations (Millions)³
1998	656.1	635.3	5,092	24.7
1999	676.3	660.7	5,224	25.1
2000	699.1	688.5	5,444	25.5
2001	724.7	720.3	5,698	26.2
2002	753.2	755.2	5,913	26.9
2003	782.9	791.7	6,119	27.5
2004	813.7	829.7	6,361	28.1
2005	845.6	869.7	6,574	28.7
2006	878.8	911.6	6,778	29.4
2007	913.4	955.6	6,983	30.0
2008	949.4	1,001.9	7,203	30.7
2009	986.7	1,050.2	7,419	31.4

Source: Federal Aviation Administration.

- 1 U.S. commercial air carriers and regionals/commuters, domestic plus international.
- 2 Commercial air carriers.
- 3 Landings and takeoffs of air carriers and air taxi/commuters at FAA and contract tower airports.



Source: ATA Airline Traffic Stats 1960-1996

Impacts of Deregulation

Before 1978, the United States airline economy was tightly regulated by the federal government. However, due to complaints of high airfares and growing concerns that government regulation was inhibiting the growth of the airline industry, the Deregulation Act of 1978 was passed. Since then, several important trends have characterized the airline industry.

Rapid expansion of overnight delivery of mail. Air cargo was deregulated a year before the passenger airlines. Deregulation was responsible for dramatic results for all aspects of the cargo business, but particularly for express package delivery for high value and time sensitive packages. Deregulation gave express carriers operating freedom, and the direct result was outstanding growth for that part of the aviation industry over the next decade.

Increase of Total Revenue Sales. Total sales revenues for the industry as a whole (in adjusted dollars) have increased each consecutive year except for a brief decline from 1989 through 1991. This brief decline can be explained largely by two factors: (1) Northwest Air Lines was private during those same years, so its revenues were not included in the industry data, and (2) Eastern Air Lines experienced a major labor strike that began in March 1989. As indicated by its financial data from 1989 to 1991, Eastern was able to continue operation, in spite of the labor strike, by charging fares below its costs. Eastern's unusually low fares may have caused other airlines to reduce fares in a similar fashion, and this reduced the total revenue earned by the industry as a whole. Current projections are that industry revenues will continue to rise due to the strengthened economy and a predicted 5% increase in airline traffic.

Increased number of airlines. Following deregulation in 1978, the number of companies increased dramatically from about 36 carriers in 1978 to a total of 123 such carriers in 1984. This initial increase resulted from the market becoming more accessible to new companies that sought to operate below the costs of older, established airlines with higher cost structures. However, a clear decline in the number of air carriers in the late 1980s followed this initial increase due to weaker airlines being forced out of business or being taken over by the stronger companies. Then by 1993, the numbers increased again as numerous small airlines emerged, offering direct, low cost, no-frills service. To compete with these lower cost airlines, many of the larger airlines are initiating their own low cost divisions. The Brookings 1986 Report estimated that the traveling public was saving \$5.7 billion a year (measured in 1977 dollars) as a result of deregulation (www.air-transport.org/handbk/chaptr02.htm).

Expanded market. A major development since deregulation was the creation of hub and spoke networks. The hubs are strategically located airports used as transfer points for passengers traveling from one location to another. The hub and spoke systems were developed in order to enable airlines to serve far more markets, with the same size fleet, than the traditional direct, point-to-point service.

Deregulation also sparked marketing innovations used by most major airlines and many smaller airlines that equate to fare discounts, such as the frequent flyer program that is designed to reward repeat customers with free tickets and other benefits.

The appearance of new airlines, combined with the rapid expansion into new markets by many of the established airlines, resulted in unprecedented popularity and competition in the airline industry. In 1977, the last full year of government regulation of the airline industry, the US airlines carried 240 million passengers. By 1993 they were carrying nearly 490 million. A study by the Department of Transportation a decade after deregulation found that well over 90% of airline passengers had a choice of carriers compared to only two-thirds in 1978 (www.air-transport.org/handbk/chaptr02.htm)

III. DESCRIPTION OF OPERATIONS

This section describes the major operations and maintenance activities within the air transportation industry. The section is designed for those interested in gaining a general understanding of the industry, and for those interested in the relationship between the industrial process associated with air transportation, and the associated environmental aspects and potential impacts of the processes. This section is not exhaustive; the operations and maintenance activities discussed are intended to represent the air transportation practices and activities with potentially significant environmental impacts. These activities are presented in two categories:

- (1) *Aircraft operations*, including maintenance, cleaning, fueling, and deicing; and
- (2) *Airport operations*, including terminal activities, loading and off loading.

This section does not attempt to replicate published engineering information that is available for this industry. Refer to Section VIII for a list of resource materials that are available.

III.A. Aircraft Operations and Associated Environmental Aspects